Renal Biopsy in Pregnancy

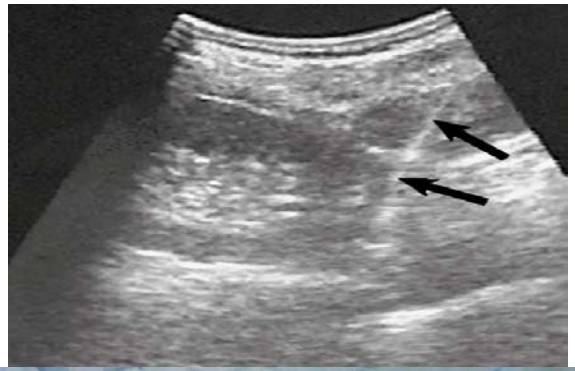
Should we bother?

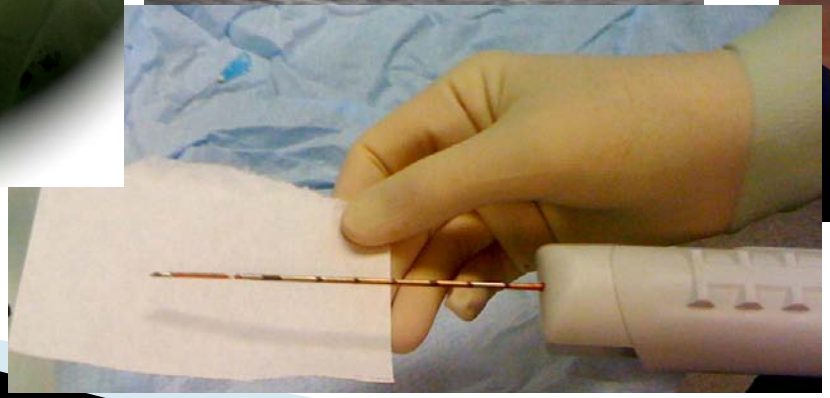
What we'll consider

1. Is renal biopsy safe?
   - In general
   - In pregnancy

2. If safe, what clinical scenarios dictate the need for biopsy in pregnancy?


St George Hospital Renal CLIFT, SUSAN
27/04/10 10:46:25 AM adm 704115
MI 0.5 TIs 0.2 3C-RS
Abdomen





Indications for Renal Biopsy

Nephrotic Syndrome

Routinely indicated in adults; in prepubertal children, only if clinical features atypical of minimal change disease

Acute Kidney Injury

Indicated if obstruction, reduced renal perfusion, and acute tubular necrosis have been ruled out

Systemic Disease with Renal Dysfunction

Indicated in patients with small-vessel vasculitis, anti–glomerular basement-membrane disease, and systemic lupus; those with diabetes only if atypical features present

Non-nephrotic Proteinuria

May be indicated if proteinuria >1g/24h

Isolated Microscopic Hematuria

Indicated only in unusual circumstances

Unexplained Chronic Kidney Disease

May be diagnostic, (e.g., identify IgA nephropathy even in "end-stage kidney")

Familial Renal Disease

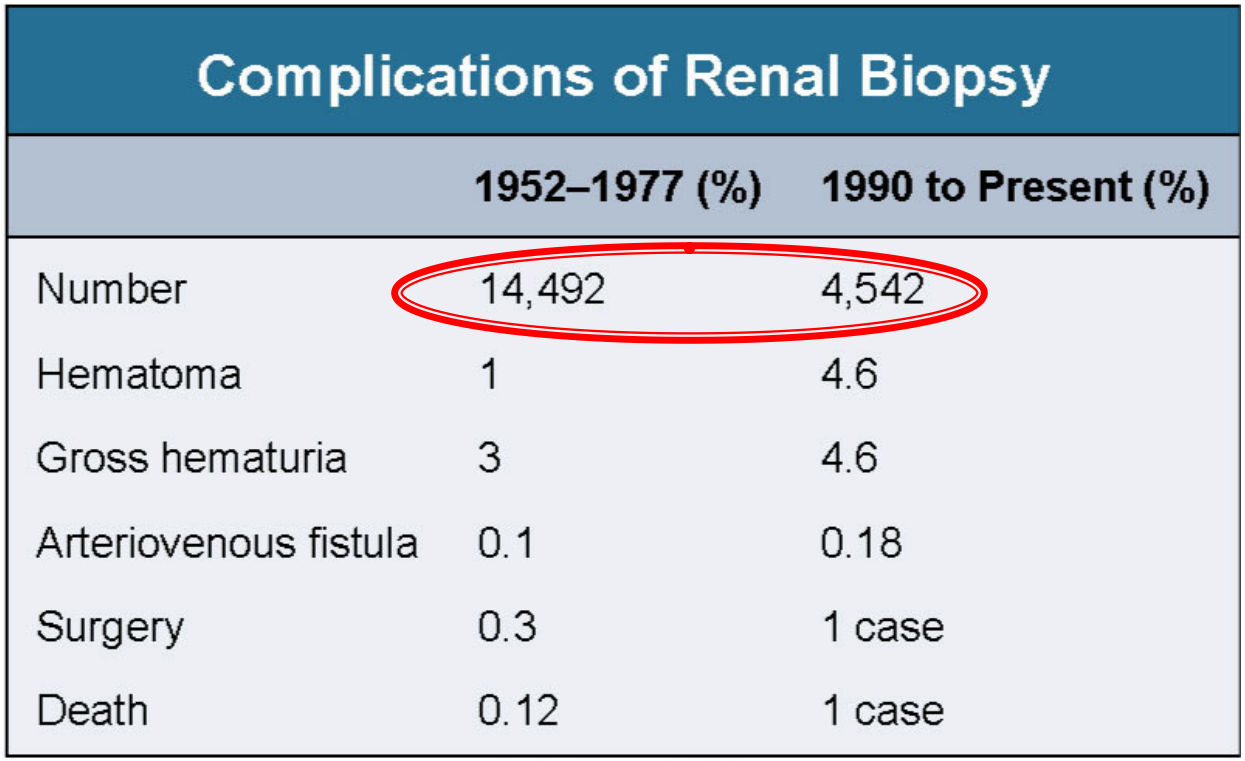
Biopsy of one affected member may give diagnosis and minimize further investigation of family members

Renal Transplant Dysfunction

Indicated if ureteral obstruction, urinary sepsis, renal artery stenosis, and toxic calcineurin inhibitor levels are not present

Contraindications to Renal Biopsy

Kidney Status	Patient Status
Multiple cysts	Uncontrolled bleeding diathesis
Solitary kidney	Uncontrolled blood pressure
Acute pyelonephritis/ perinephric abscess	Uremia
Renal neoplasm	Obesity Uncooperative patient



Complications of Renal Biopsy

	1952–1977 (%)	1990 to Present (%)
Number	14,492	4,542
Hematoma	1	4.6
Gross hematuria	3	4.6
Arteriovenous fistula	0.1	0.18
Surgery	0.3	1 case
Death	0.12	1 case

Data from references 12, 17, 19-25.

Fig. 6-9. **Complications of renal biopsy.** The data for 1952 to 1977 are taken from 20 series including 14,492 patients. *(Data from reference 18.)* The 1990 to present data are from eight series including 4542 patients.

Packham & Fairley – 111 cases

Kuller et al. AJOG. 2001; 184:1093
18 cases – 7 hematomas; 2 transfusions; 4 FDIU ?unrelated

Schewitz *et al.* 1965 describing gross haematuria in 16.7% of 77 women, 4.4% developing peri-renal haematomas and 1 maternal death

Scenario #1

- A 24 yr old previously well primigravid woman at 37 weeks develops new onset proteinuria 2g/day, creatinine 70umol/L (N), albumin 35g/L, with hypertension 160/110 mmHg.
  - Her treating team diagnose pre-eclampsia and she is delivered
  - Proteinuria (3+ or 3g/L) is still present 10 days later
  - Renal biopsy is recommended
- Do you agree?

History

- “renal biopsy was once practiced quite extensively during pregnancy, **primarily in the evaluation of preeclampsia**, to try to understand that disorder’s renal pathology”

- “ the belief was that postpartum renal biopsy was important in counselling women who had apparently been preeclamptic on the sagacity of another pregnancy”

  - The latter proved neither that helpful nor necessary

Marshall Lindheimer 2012

One important cautionary tale

- “Fisher et al, reviewed clinical pathological correlations of 176 women biopsied at Lying in hospital with suspected preeclampsia.

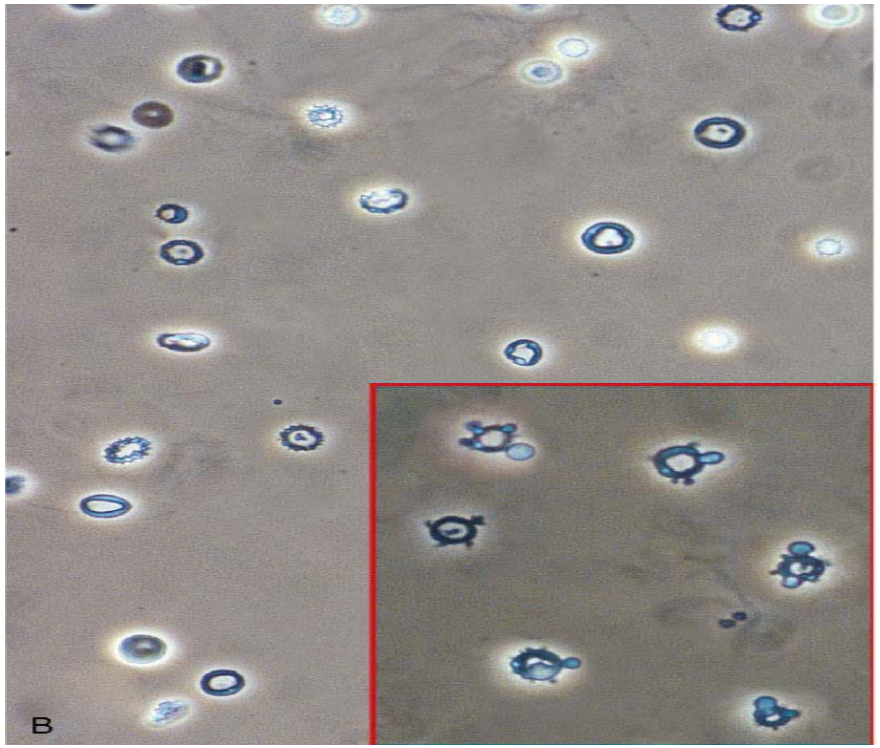
- “ The take home message was the clinical diagnosis was only correct in about 85% of primiparas , and approached 50% in the multiparous populations. (Fisher et al. Medicine 1981;60:267).

  - 176 Biopsies Chicago, 1958-76
  - Retrospective chart reviews
  - Assumption that endotheliosis was diagnostic of pre-eclampsia
  - Remainder ‘nephrosclerosis’
    - Description is likely chronic hypertension vascular disease

Marshall Lindheimer 2012

Scenario #2

- A 24 yr old previously well primigravid woman is found to have dysmorphic microscopic hematuria and proteinuria 2g/day, creatinine 70umol/L (N), albumin 35g/L, with hypertension 160/100 mmHg at 18 weeks.
- Renal biopsy is recommended.
- Do you agree?



History

- “following several reports of post biopsy severe bleeding of preeclamptics (not surprising for a hypertensive disease that occasionally leads to the rapid appearance of severe thrombocytopenia), renal biopsy in preeclampsia and pregnancy fell into disrepute

- “This was rekindled during 1987 when Packham and Fairley reintroduced the subject with a BJOG article (94:935-9) where they underscored its importance for differential diagnosis, managing pregnancy, and claimed its dangers were overstressed with a safety record similar to nongravid individuals and their record should have made all Aussies proud……”

  - “Renal biopsy in pregnancy to b… or not to b…” (94:932-4).
    - the procedure be used but rarely

Renal Biopsy in Pregnancy

- 111 biopsies in 104 pregnant women; 1965-85
- 90 performed by one physician (KF)
  - 101 fluoroscopy; 10 ultrasound; all prone
  - all 24hr bed rest; all normal platelet count, bleeding times, coags
- All indications first observed in 1st or 2nd trimester
  - 22 known GN/SLE and re-biopsied to assess progression
- Gestation at biopsy 4-28 weeks; median 15 weeks

Packham D, Fairley KG. Br J Obst Gynaecol 1987;94:935

Renal Biopsy in Pregnancy

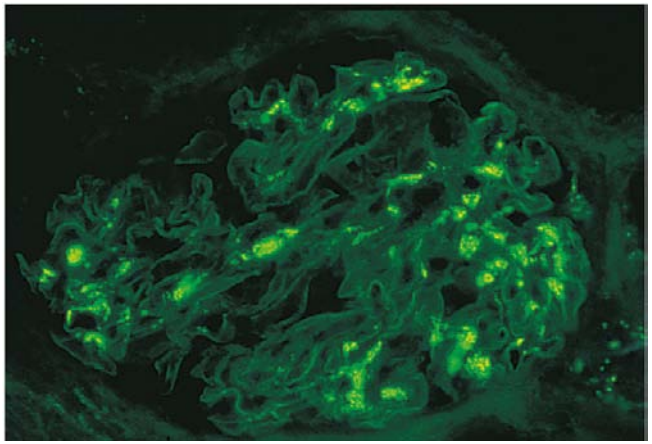
- 76 women biopsied for new findings in pregnancy
  - 6 impaired GFR;
  - 9 nephrotic – 7 membranous
  - 4 normal urine sediment & GFR but prior severe PE
  - Remainder hematuria and/or non-nephrotic proteinuria
- Complications
  - 1 severe bleed at 25 weeks – transfused – APH – FDIU
  - Hematuria 2%; loin pain 3%; inadequate tissue 3%
  - Over 90% no complications

Packham D, Fairley KG. Br J Obst Gynaecol 1987;94:935

Renal Biopsy in Pregnancy

- 80% of these 76 women had GN;
  - remainder normal

- Diagnoses
  - 33% IgA
  - 20% non-IgA mesangial proliferative
  - 20% membranous
  - 17% FSGS
  - 8% MCGN
  - 3% others

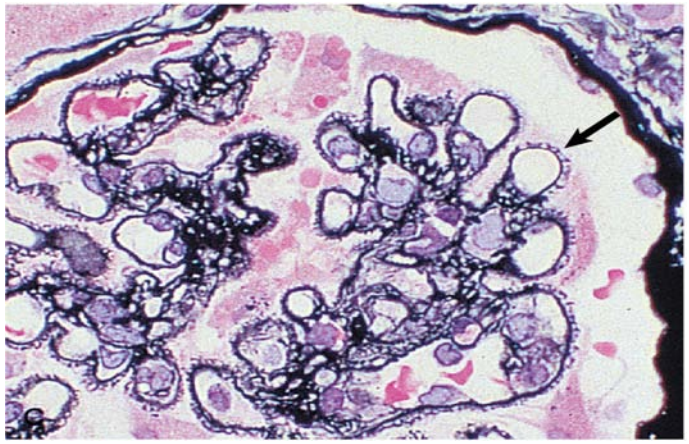


Packham D, Fairley KG. Br J Obst Gynaecol 1987;94:935

How many of these diagnoses would have altered treatment during pregnancy?

- Possibly 7/76 ?
  - Diagnosing membranous instead of MCN and avoiding steroids when nephrotic

- Unclear how strong an indication to biopsy others for assessing progress



Scenario # 3

- You wish to “investigate the proportion of women with hypertensive disease in pregnancy, with and without proteinuria, having the characteristic morphologic findings of pre-eclampsia”
  - You decide to undertake a renal biopsy research study
  - You wish to include normal pregnant women as controls
  - Renal biopsy is required during pregnancy as part of this study; you obtain ethics approval.
- Do you agree with renal biopsy in this case?

The most controversial renal biopsy study to date:

Strevens H et al. BJOG : Volume 110, Issue 9, pages 831–836, September 2003

The current approach:

The role of renal biopsy in women with kidney disease identified in pregnancy

1. 20 women presenting with renal disease
   - glomerular disorder in 19/20 (95%) with immediate change of management in 9/20 (40%)
   - One patient had minor post-biopsy haematuria which settled spontaneously

2. 75 women who had an initial presentation of renal disease in pregnancy and underwent ***post-partum*** renal biopsy
   - Generally > 6 months.
   - glomerular abnormality was found in 64%

Clara Day et al. *Nephrol. Dial. Transplant. (2008) 23 (1): 201–206*

The role of renal biopsy in women with kidney disease identified in pregnancy

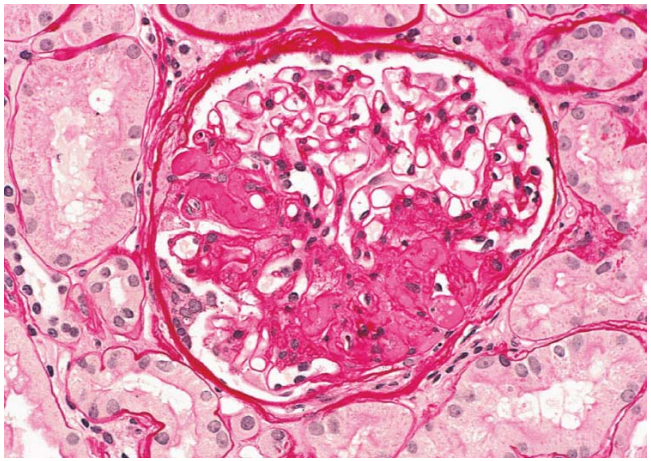
Clinical features of women biopsied in pregnancy –*debatable but all reasonable*

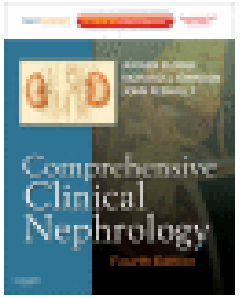
	Age	Gestation (weeks)	Creatinine (µmol/l)	Albumin g/24 h	Immunology	Biopsy diagnosis
1	20	27	74	2.9	Negative	FSGS
2	32	16	99	0.2	ANA+	Granulomatous interstitial nephritis
3	31	17	321	12.5	ANA1:400	Active lupus nephritis
4	28	20	300		dsDNA+	Active lupus nephritis
5	29	31		Nephrotic	negative	Lupus nephritis
6	24	21	94	1.4	Negative	FSGS
7	29	6		Nephrotic	n/a	Minimal change nephropathy and acute tubular necrosis
8	26	13			n/a	Membranoproliferative gn and dense deposit disease
9	17	25	68	10.2	ANA1:1600 dsDNA152	Lupus nephritis
10	22	30	70	7.1	ANA1:1600 dsDNA337	Lupus nephritis
11	19	8	81	Nephrotic	n/a	Familial non-IgA mesangioproliferative GN
12	24	23	78	2.7	Negative	FSGS
13	39	31	55	0.9	Negative	FSGS
14	37	24	80	7.3	ANA+C4low	FSGS
15	31	27	56	9	ANA+dsDNA +SSA+	Lupus nephritis
16	37	9	160	0.6	ANCA 1:25	Membranoproliferative GN sec to SCD
17	22	7	47	1.2	dsDNA127	Lupus nephritis
18	21	8	73	6	ACAIgM 23	Sickle cell nephropathy
19	35	14	174	4	Negative	Henoch Schonlein nephritis with severe chronic damage
20	39	26	86	1.8	Negative	IgA nephropathy

Indications for Renal biopsy in Pregnancy

- It is rare for renal biopsy to be required in pregnancy.

- “After 32 weeks of gestation, if the renal state has changed so much that biopsy is considered necessary to guide treatment, it is better to deliver the baby and to manage the renal disease outside of pregnancy”.





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Indications for Renal biopsy in Pregnancy #1

***De novo* onset of nephrotic-range proteinuria or unexplained impaired GFR with abnormal urine sediment before fetal viability, that is, before 24 weeks of gestation**.

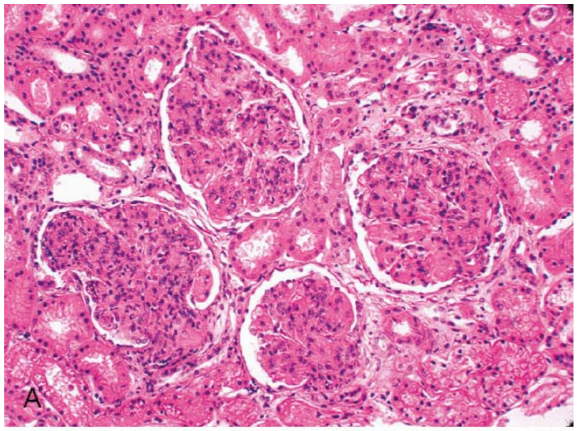

Fig. 25-7A. **ISN/RPS class IV: lupus nephritis. A,** Active diffuse proliferative lupus nephritis. **B,** By immunoperoxidase staining, there are dense irregular aggregates of IgG along the peripheral capillary walls. **C,** Electron microscopy reveals the immune

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Indications for Renal biopsy in Pregnancy #2

Before 32 weeks of gestation:

when the clinician and patient have **agreed that immunosuppression or plasma exchange will be used** if necessary :

i. rapidly declining GFR without any apparent reversible cause in women with underlying primary glomerulonephritis;

(+/- indication)

ii. acute kidney injury of no other cause with active urine sediment;

iii. declining GFR or increasing proteinuria in a woman with lupus nephritis or lupus without previously known nephritis

(+/- indication)

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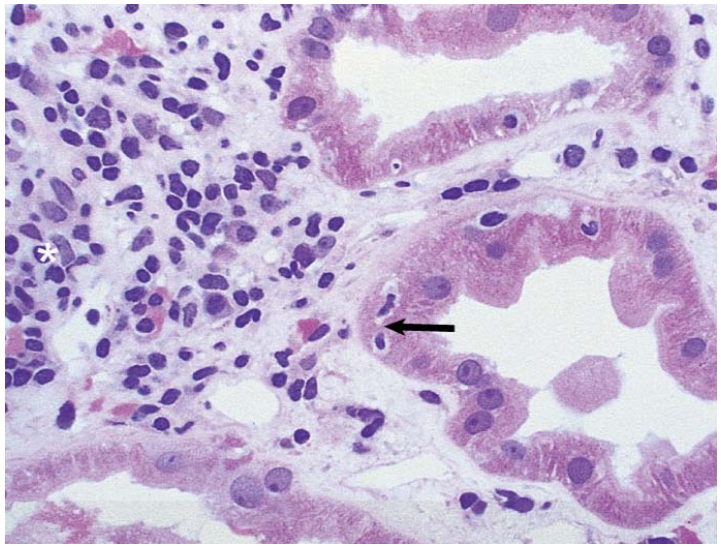
Indications for Renal biopsy in Pregnancy #3

Deteriorating GFR before 32 weeks of gestation without obvious cause in a woman with a **kidney transplant, to exclude acute rejection.**



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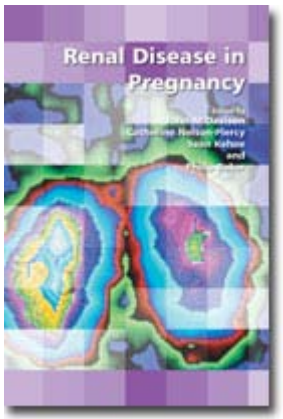
A really sensible review

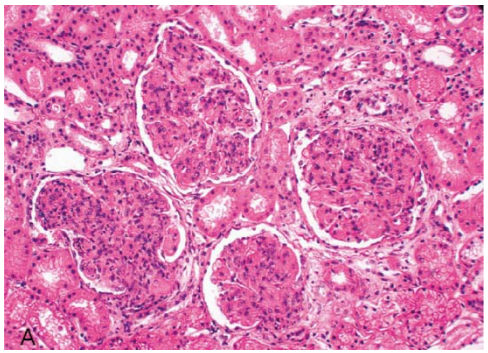
Nigel J Brunskill
Renal Biopsy in Pregnancy

In: Renal Disease in Pregnancy
Eds: Davison JM, Nelson-Piercy C, Kehoe S, Baker P
RCOG Press 2008; p 201



Conclusions

1. We don’t know for sure that renal biopsy is safe
2. It is rarely needed
3. Consider it for the 3 indications above



- Never biopsy unless a change in management has been agreed first